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ENGINEERS  
in the Forest Service

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Civil Engineers

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## Professional Challenges in

Transportation System Planning and Operation

Road, Trail, and Highway Construction and Maintenance

Water Supply

Domestic and Solid Waste Disposal

Surveying and Mapping

Cadastral Engineering

Environmental Engineering

Dams

Bridges

Structures

Construction Engineering

Photogrammetry

Fleet Equipment Management

Equipment Development and Testing

Facilities

Electrical Distribution Systems

Communications

Power

## Contents

Today's Frontier	2
To Pioneer/A Special Career	3
A Career Of Growth	3
Civil Engineering/General	5
Civil Engineering/Specialized	6
Planning, Design, and Construction	7
Roads and Highways	7
Bridges	7
Structures	8
Water	8
Land	9
Mechanical Engineering	11
Engineers In Research	13
Electrical Engineering	15
Basic Entrance Requirements	16
How To Apply	16
Life In The Forest Service	17
More Than A Job	17

## Today's Frontier

The conservation of man's total environment is coming into its own as a public issue. For more than a half century, the Forest Service of the Department of Agriculture has been on the ramparts of this frontier. The first advocates were President Theodore Roosevelt and the first Chief of the Forest Service, Gifford Pinchot, who pioneered the concept and laid the foundations of present-day conservation.

With a gratifying public awakening to the problems of pollution, conservation's horizon has been widened to include not only natural resources but man's total environment. In this drive today, full development of forest resources can make a better environment for all Americans.

Out on the ramparts of this new frontier, the young engineer can find a challenging profession and a rewarding personal life.

*James J. Byrne*  
J. J. Byrne  
Director of Engineering

## To Pioneer/A Special Career

For 300 years, the challenge of America has been to pioneer on the frontiers—to face new and often dangerous situations and problems with courage and confidence, and to solve them with originality and resourcefulness. In the 20th Century, few Americans have found such challenges. But, that challenge does exist today—in the Forest Service—a pioneering challenge in the open-air environment of forested mountains and streams breathing the freedom of frontier America.

The National Forest System, covering 187 million acres, contains much of the water, grazing lands, wildlife, and timber upon which our Nation depends. And these lands must provide outdoor recreation for many millions of people. During the next 30 years, the demand for these valuable resources will increase. By the year 2000, we will need twice as much lumber from the same forest acreage, use three times as much water from the same streams and rivers, and provide seven times as much recreation use on the National Forests. The total National Forest area will not be increased. How can these needs be met without destroying or seriously damaging the balance of nature and the natural forest environment?

This is the frontier of the Forest Service engineer!

This is the challenge!

## A Career Of Growth

To solve the complex and unique problems of engineering in a resource environment requires more of a Forest Service engineer than he can learn in college—or perhaps in a lifetime.

From his first day with the Forest Service, the new engineer gets a look at the vast complexity of modern forest engineering. He learns that he will be involved with transportation systems, planning and development, photogrammetry, cadastral engineering, data processing, materials engineering, structural engineering, and water supply and environmental engineering.

From the beginning, the young engineer is involved in work that leaves its mark on today's conservation frontier. He will be a sharing partner in plans and projects that will ultimately make America a more wholesome and attractive place for all.

His professional growth will accelerate quickly. The new engineer moves from on-the-job training to assuming responsibility for projects of increasing difficulty. During the first 5 years, he will choose a specialty from the broad spectrum of engineering.

At the end of these first 5 years, he will have demonstrated his potential. Those who measure up to the demands of this very special profession soon move into positions of leadership.





## Civil Engineering/General

The Forest Service needs Civil Engineers who are more than just field engineers. Total forest engineering demands skilled people in managerial positions—part of a team that plans, coordinates, and executes forest development. The makeup of this "pioneer team" reflects the diversity of the Forest's demands: Wildlife biologists, timber management specialists, forest protection experts, forest products specialists, range managers, landscape architects, soil and watershed specialists, recreation planners, business management specialists, structural architects, and civil engineers. Each brings his own particular skill to help solve the problems of overall forest management and development.

The Civil Engineer is an important member of this pioneer team. He works with other members on a variety of engineering projects within the National Forests. His work begins with planning and follows through to project completion.

His experience as a Civil Engineer is broad in scope and his career is enriched through self-study, continued education, professional registration, and technical society affiliation. Management training qualifies him for higher supervisory positions, such as a forest engineer, a member of the engineering staff of a Regional Office or design office or part of the staff of the Director, Division of Engineering, Washington, D.C.



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**Civil Engineering/Specialized**

Total engineering in the National Forest demands the skills of experts—Civil Engineers who specialize in a particular facet of Forest Service engineering. They are assigned to projects within one or more National Forests. Here, the novice Civil Engineer becomes part of the local pioneer team—the squad of experts whose specialties span the vast technical demands of forest development and management. With the help of all members of the team, an engineering plan is developed to preserve the intricate balance of nature in the forest while meeting the goals of the project. This technical specialist engineer may become, with training and experience, a forest, area, regional, or even a National technical expert in a field he chose earlier when a novice.

## Planning, Design, and Construction

**ROADS AND HIGHWAYS** The pioneer-team concept reaches full maturity in the 370,000-mile National Forest road and highway building program. The Civil Engineer works with experts in timber management, landscape architecture, watershed management, and other resource managers in planning the road and highway systems. The engineering staff of the local National Forest has primary responsibility for putting into effect the team's technical plans. The responsibility of the Civil Engineer road and highway specialist includes: Road design, often using computers, establishment of design and construction standards, construction engineering and management, economic analysis of proposed projects and programs, highway safety engineering, and other technical component needs.

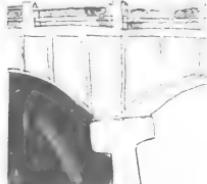
**BRIDGES** Bridge building in the Forest Service is unique—unique because each situation is a challenge to the so-called typical designs. Every project presents a problem that requires a high degree of professional competence and creativity. Design, type, materials, and location are essentially the Civil Engineer's responsibility. A Civil Engineer who specializes in bridge construction will find his imagination and ingenuity tested to the utmost.



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**STRUCTURES** The Forest Service needs many more structures to accommodate the more than 100 million Americans who visit National Forests annually.

The Civil Engineer must plan, design, and produce structures which will preserve and enhance the natural beauty of their setting and fit into the total forest environment, for maximum economy and utility. These structures range from lookout towers to dams, ski tows, and lifts, from information centers to research laboratories, and from administration offices to shops and warehouses.

**WATER** Protection and wise use of water from National Forests is a major concern of the Forest Service. Total development of this resource is another job for the pioneer team.

This total development begins with watershed protection in the mountainous areas where heavy spring runoff can be a serious problem. Control of erosion to minimize loss of surface material and provide clean water is a duty of the Civil Engineer, working with experts in watershed management and other forestry fields.

As the demand for water by cities, towns, and industries continues to increase, the search for water and water power leads to the headwaters of our great rivers, which often originate on National Forest land.

To plan new dams and developments, the Forest Service Civil Engineer often works with the Corps of Engineers, Bureau of Reclamation, and other agencies, to produce a coordinated environmental program.

During planning and construction, he must consult with them on flood routing, reservoir levels, minimum water releases for downstream needs, and other matters.

The more than 100 million Americans who annually visit National Forests also need vast quantities of clean, safe water for drinking and recreation, and for washing, cooking, and sewage disposal. Civil Engineers must provide safe and ample water supply and proper disposal of sewage and other wastes, often in extremely difficult locations and conditions.

By specializing in sanitary engineering, water supply, and hydraulics, the Civil Engineer accumulates valuable knowledge and experience to become truly a pioneer engineer.



**LAND** Maps of all kinds—topographic, planimetric, resource, planning, and inventory—all are essential tools in the effective management of the land areas administered by the Forest Service. Civil Engineers who choose this specialty must employ the most advanced techniques, including extensive photogrammetry.

Cadastral surveys control the use of National Forest land. Civil Engineers use photogrammetry, laser beams, and electronic measuring devices to assist them establish property lines and corners, furnish legal descriptions, identify land, determine its size, and produce maps. New technical developments make this a fast-growing specialty.



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## Mechanical Engineering

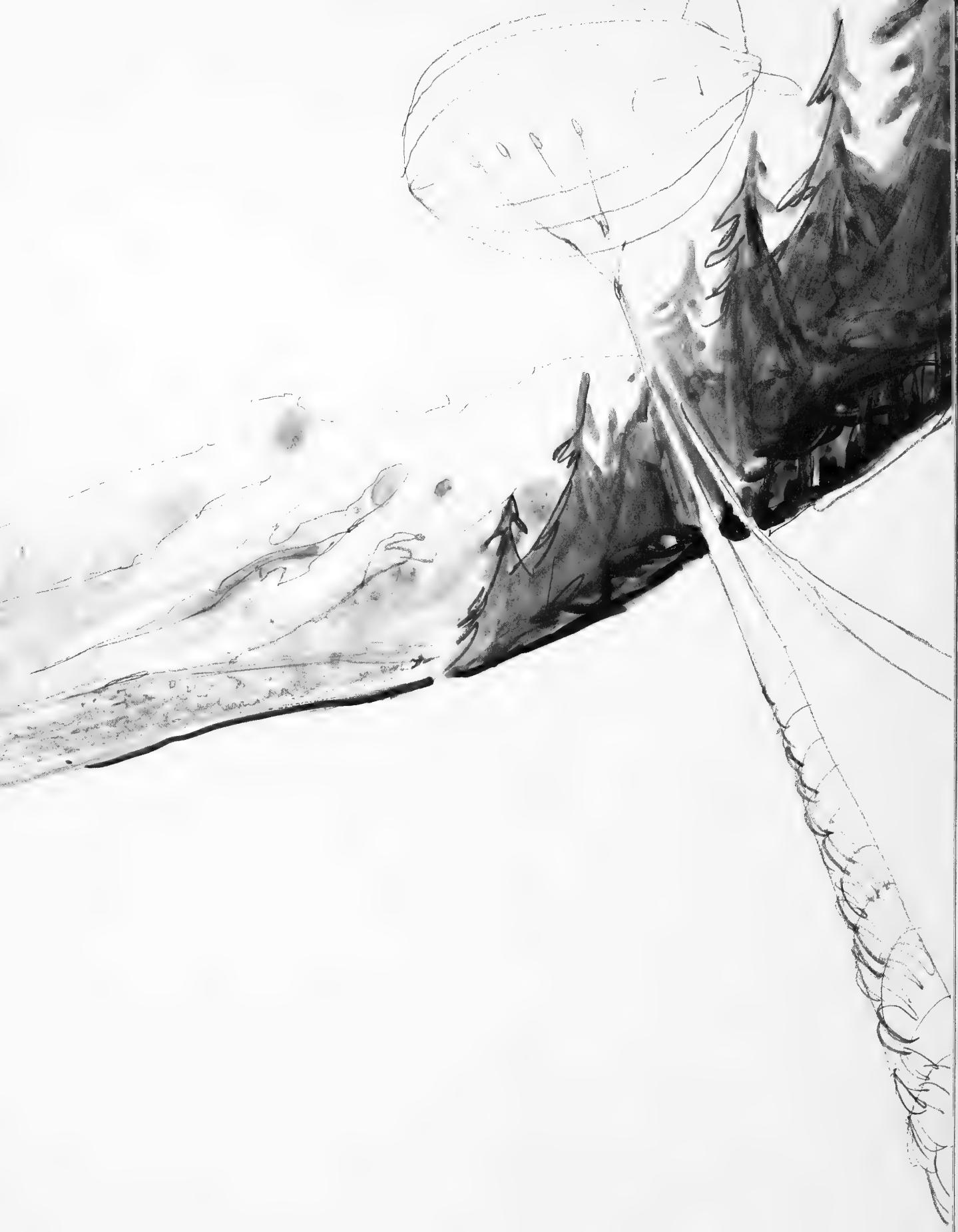
Ever-new frontiers are unfolding for the mechanical engineer. Coordinating, applying, and developing an immense variety of mechanical equipment is the job of the Forest Service Mechanical Engineer. His responsibilities fall into two major areas: Equipment management and equipment development and testing.

The equipment manager must select the right equipment for every transportation, construction, or maintenance job. He is responsible for purchase, maintenance, replacement, and general management of one of the Nation's largest fleets of equipment.

His assignments constantly challenge his professional ability and growth, thus making him a valuable member of the pioneer team.

If the job requires machinery or equipment that is not available, the Forest Service must develop its own. Mechanical engineers at Equipment Development Testing Centers, work with major equipment producers in the United States and abroad, choosing either to modify existing equipment or to develop new designs. Systems analysis techniques are frequently employed. Development of standards for equipment, and the testing and evaluation of commercially produced items are important Equipment Development Center activities of Mechanical Engineers. Examples of past accomplishments include devices for release of fire-retardant chemicals, insecticides and herbicides from aircraft, and salmon spawning bed improvement devices. Most of the fire control equipment now used by the Forest Service and others was built in accordance with design features originated by Mechanical Engineers at Equipment Development Centers. Construction and transportation equipment are other examples offering wide pioneering opportunities.



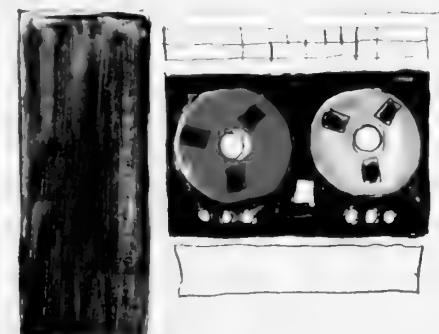


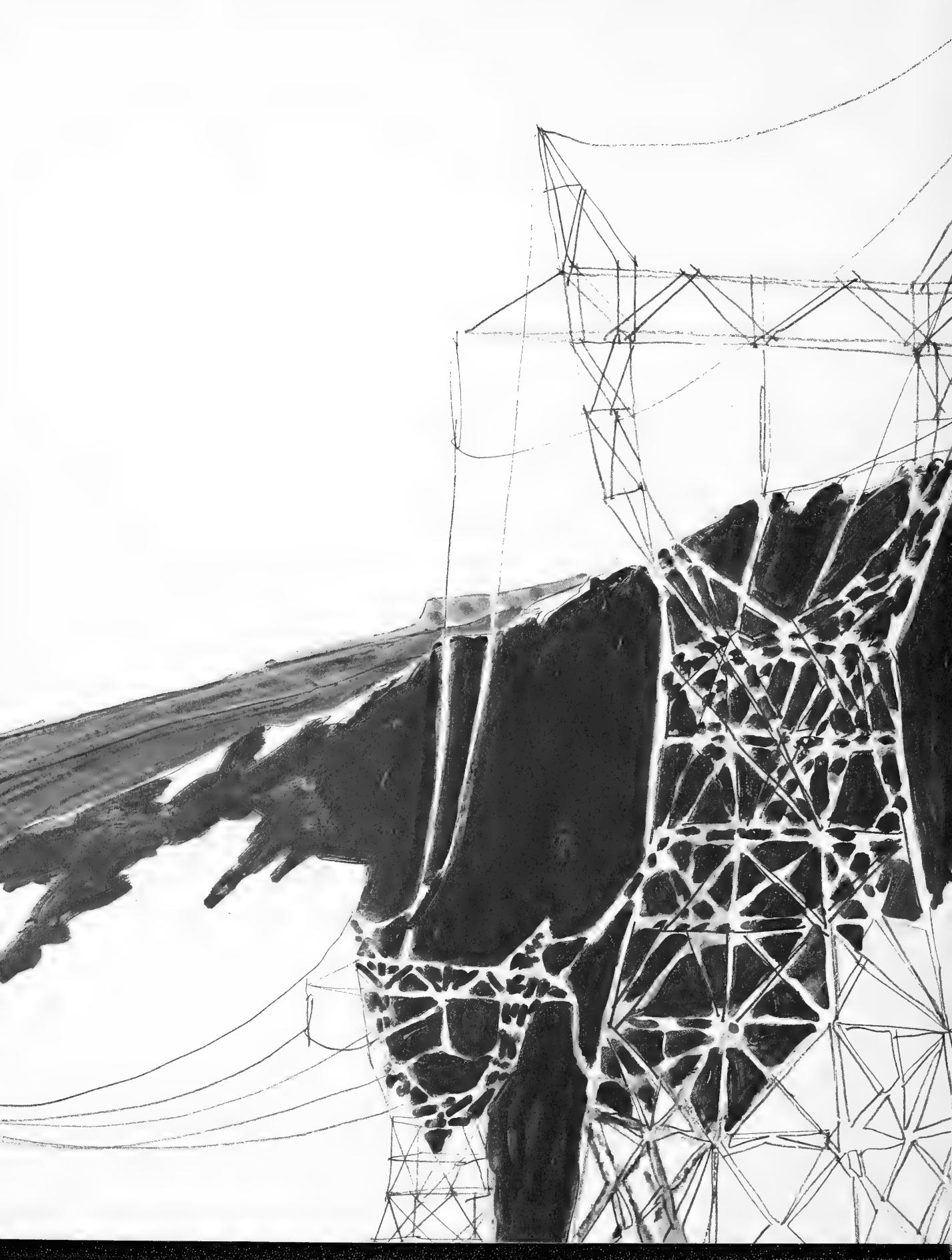
## Engineers In Research

The Forest Service is a world leader in research in the field of forest management and wood products. For the research-minded engineer, highly specialized, with advanced degrees—the Forest Service offers exceptional opportunities. Research engineers work on wood engineering, solid wood products, wood fibers and wood chemistry, mechanization of field operations, development of new engineering techniques of forest products utilization systems, and wood structure design principles. Forest Service research laboratories also use engineers in forest fire research, timber harvest, and forest products transportation methods.

The Forest Service is justly proud of its internationally renowned Forest Products Laboratory at Madison, Wisconsin.

Forest Service Research Engineers work closely with some of the world's leading engineers and scientists—officials in private industry, experts from other countries and other government agencies, and a variety of other research specialists. This cooperative effort is part of the research engineer's growth—both personally and professionally. The Forest Service Research Engineer helps to provide our Nation with an abundance of wood, water, forage, and recreation without destroying the delicate balance of nature necessary for the survival of forest resources.





## Electrical Engineering

**COMMUNICATION** The Forest Service has long been a leader in communication. Effective voice communication over the long distances, vast unsettled areas, and rough mountainous terrain of the National Forests is an enormous challenge. The Forest Service Electrical Engineer meets this problem by developing and coordinating a great variety of communication systems. This work ranges from telephone systems to microwave transmission. In addition, the design for power transmission lines, private power plants, ski lifts, and large recreational developments requires the skills of an electrical engineer to coordinate designs with all environmental needs of the National Forests.



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## Basic Entrance Requirements

Basic requirements for all professional engineering positions: Candidates must show successful completion of A or B below:

A. A full 4-year or longer professional engineering curriculum, accredited by the Engineers' Council for Professional Development, leading to a Bachelor's or higher degree; or other professional engineering curriculum in an accredited college or university (accredited by a regional accrediting association or by the State University or State Department of Education of the State in which the school is located) substantially equivalent thereto in type, scope, content, and quality; or

B. A total of not less than 4 years of college-level education, training, and/or technical experience of such nature and extent that, taken in conjunction with any private study, they furnished (1) a thorough knowledge of the physical and mathematical sciences underlying professional engineering and (2) a good understanding, both theoretical and practical, of the engineering sciences and techniques and their application to one of the branches of engineering, substantially equivalent to that furnished by a full 4-year or longer professional engineering curriculum, accredited by the Engineers' Council for Professional Development. In addition, fulfillment of one of the following requirements: (1) Written test; (2) specified academic courses; (3) professional stature; (4) curriculum in closely-related fields.

## How To Apply

Check with your school placement office to learn when a Forest Service representative will visit your campus. Sign up for an interview appointment. If your school has not scheduled a visit for our representatives, you may still apply by completing the SF-171, Personal Qualification Statement, and mailing it to the Washington, D.C., or Regional Office of your preference. It is necessary in any case for us to have your application certified by the Civil Service Commission for that specific area. As our Regional Office representatives work daily with the Commission, it will not be necessary for you to look up the proper Commission Office. We will do it for you.



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## Life In The Forest Service

Unlike that of many other engineers, the Forest Service engineer's job gives him the best of two worlds—the advantages of an urban society, plus the chance to spend his working hours amid the wild glory that is the National Forests.

Most engineering units are located in small cities of 10,000 to 20,000 population—large enough to have adequate urban services and facilities, yet close to nature and the recreational advantages of a National Forest. These places are ideal for raising families. They are places where children can learn the lessons and enjoy the excitement of the outdoors, which are denied them in larger urban environments.

The Forest Service engineer becomes a member of the Forest Service "family," a large group of people dedicated to and working toward one goal: The protection, development, and enhancement of the Nation's total environment.

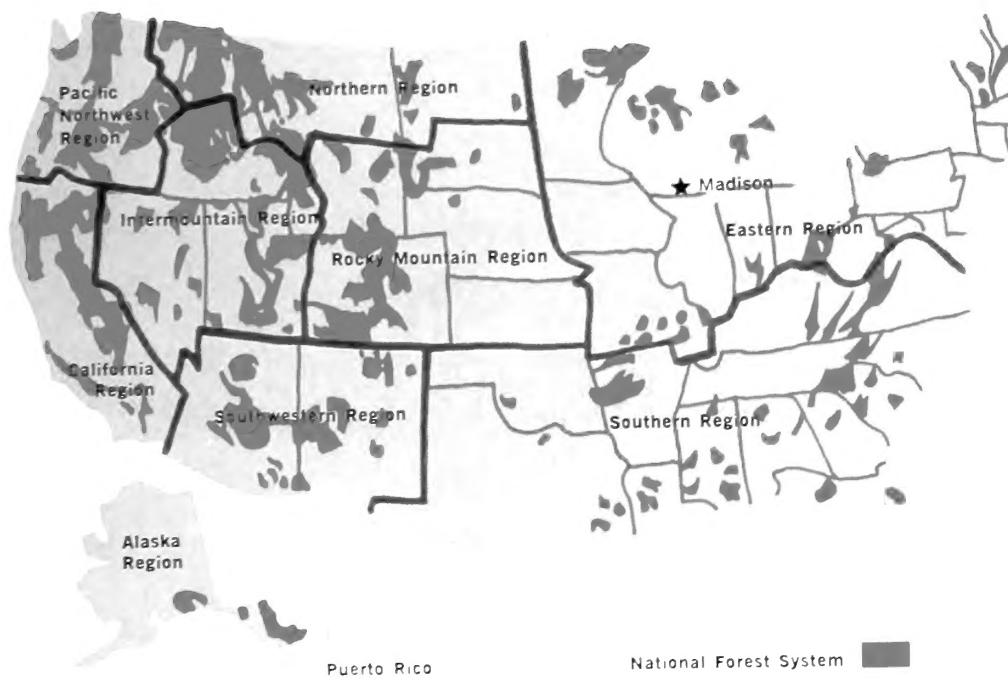
Altogether, this adds up to a challenging profession and a rewarding personal life.

## More Than A Job

The work of a Forest Service Engineer will occasionally require travel that keeps him from returning home at night, especially when he works on a forest fire, or is temporarily assigned to a remote survey or construction site.

These small sacrifices are part of the job—a job that will grow in importance as his abilities increase. Often, with a promotion comes a change in assignment that makes moving necessary. In such moves, the Service assists in every possible way, advancing relocation funds and helping find temporary or long-term housing. Salaries are competitive with private industry, life and health insurance is available, as is one of the best retirement systems, and awards for achievement by the United States Government, his employer.

In short, a Forest Service career is more than just a job—it is a way of life—an opportunity for a young engineer to grow in his professional skills while pioneering a healthy, creative life for his family and himself.



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